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REPUBLIC OF SOUTH AFRICA

PATENT KANTOOR
DEPARTEMENT VAN HANDEL
EN NYWERHEID



03 MAR 2004

Certificate

REPUBLIEK VAN SUID-AFRIKA

PATENT OFFICE
DEPARTMENT OF TRADE AND
INDUSTRY

Hiermee word gesertifiseer dat
This is to certify that

2002/10079

03 MAR 2004

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WIPO PCT

- 1) South African Patent Application No. **2002/10079** accompanied by a Provisional specification was filed at the South African Patent Office on **12 December 2002** in the name of **Denel (Pty) Ltd** in respect of an invention entitled: "**Gun tube support assembly**"
- 2) The photocopy attached hereto is a true copy of the provisional specification and drawings filed with South African Patent Application No. **2002/10079**.

Geteken te

PRETORIA

Signed at

in die Republiek van Suid-Afrika, hierdie

in the Republic of South Africa, this

25th

dag van

February 2004

day of

R. Goepo

Registrar of Patents

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REGISTER OF PATENTS

PATENTS ACT, 1978

OFFICIAL APPLICATION NO.

LODGING DATE : PROVISIONAL

ACCEPTANCE DATE

21 01 2002/10079

22 8 April 2003

43

INTERNATIONAL CLASSIFICATION

LODGING DATE : COMPLETE

GRANTED DATE

51

23

FULL NAME(S) OF APPLICANT(S) / PATENTEE(S)

71 DENEL (PTY) LTD

APPLICANTS SUBSTITUTED :

71

DATE REGISTERED

ASSIGNEE(S)

71

DATE REGISTERED

FULL NAME(S) OF INVENTOR(S)

72 PAUL, Lothar Alwin

KOTZÉ, Theunis Gerhardus Nicolaas

DE SWARDT, Rolf Reitz

PRIORITY CLAIMED

COUNTRY

NUMBER

DATE

N.B. Use international
abbreviation for country.
(See Schedule 4)

33

31

32

TITLE OF INVENTION

54 GUN TUBE SUPPORT ASSEMBLY

ADDRESS OF APPLICANT(S) / PATENTEE(S)

368 Selbourne Avenue
Centurion
PRETORIA
0182
South Africa

ADDRESS FOR SERVICE

74 D M Kisch Inc, 54 Wierda Road West, Wierda Valley, SANDTON

REF

P25535ZA00

PATENT OF ADDITION NO.

DATE OF ANY CHANGE

61

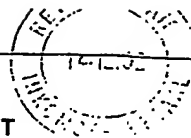
FRESH APPLICATION BASED ON

DATE OF ANY CHANGE

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978

APPLICATION FOR A PATENT AND ACKNOWLEDGEMENT OF RECEIPT
(Section 30 (1) - Regulation 22)

The grant of a patent is hereby requested by the undermentioned applicant
on the basis of the present application filed in duplicate.



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Form P.1

OFFICIAL APPLICATION NO	
21	01 2002/10079

DMK REFERENCE
P25535ZA00

FULL NAME(S) OF APPLICANT(S)

71	DENEL (PTY) LTD
----	-----------------

ADDRESS(ES) OF APPLICANT(S)

368 Selborne Avenue Centurion PRETORIA South Africa
--

TITLE OF INVENTION

54	GUN TUBE SUPPORT ASSEMBLY
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THE APPLICANT CLAIMS PRIORITY AS SET OUT ON THE ACCOMPANING FORM P2 The earliest priority claimed is	
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THIS APPLICATION IS FOR A PATENT OF ADDITION TO PATENT APPLICATION NO.	
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THIS APPLICATION IS FRESH APPLICATION IN TERMS OF SECTION 37 AND BASED ON APPLICATION NO.	
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THIS APPLICATION IS ACCOMPANIED BY :

x	1a	A single copy of a provisional specification of 8 pages.	21	01
	1b	Two copies of a complete specification of pages.		
	2a	Informal drawings of sheets.		
x	2b	Formal drawings of 3 sheets.		
	3	Publication particulars and abstract (form P8 in duplicate).		
	4	A copy of figure of the drawings for the abstract.		
	5	Assignment of invention (from the inventors) or other evidence of title.		
	6	Certified priority document(s).		
	7	Translation of priority document(s).		
	8	Assignment of priority rights.		
	9	A copy of form P2 and a specification of S.A. Patent Application.	21	01
	10	A declaration and power of attorney on form P3.		
	11	Request for ante-dating on form P4.		
	12	Request for classification on form P9.		
	13a	Request for delay of acceptance on form P4.		
	13b			

DATED

12 December 2002

ADDRESS FOR SERVICE	
74	D M Kisch Inc 66 Wierda Road East Wierda Valley SANDTON

Patent Attorney for Applicant(s)

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REGISTRAR OF PATENTS

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REPUBLIC OF SOUTH AFRICA

PATENTS ACT, 1978

PROVISIONAL SPECIFICATION
(Section 30 (1) - Regulation 27)

OFFICIAL APPLICATION NO.			LODGING DATE		DMK REFERENCE
21	01	2002/10079	22	12 December 2002	P25535ZA00
FULL NAME(S) OF APPLICANT(S)					
71	DENEL (PTY) LTD				
FULL NAME(S) OF INVENTOR(S)					
72	PAUL, Lothar Alwin KOTZÉ, Theunis Gerhardus Nicolaas DE SWARDT, Rolf Reitz				
TITLE OF INVENTION					
54	GUN TUBE SUPPORT ASSEMBLY				

GUN TUBE SUPPORT ASSEMBLY

INTRODUCTION AND BACKGROUND TO THE INVENTION

This invention relates to a gun tube support assembly.

5

A conventional gun tube support assembly for a gun such as a cannon or the like comprises a single solid metal cradle bush or a plurality of solid metal cradle bushes arranged annularly around a gun tube of the gun. The annularly arranged cradle bushes receive and support the gun tube and the gun tube
10 slides therein when the gun is fired.

A first disadvantage of the conventional gun tube support assembly is that when the gun is fired, kinetic energy is transferred from a projectile passing through the gun tube to the cannon structure via the solid metal cradle bushes
15 to cause metal fatigue and a decrease in the lifespan of the cannon.

Further disadvantages of the conventional gun tube support assembly are that the solid metal cradle bushes retains expansion and vibration of the gun tube and thus restrains the projectile when passing through the gun tube and causes
20 excessive structural strains in the projectile, thus having a negative effect on internal ballistics. The projectile is further less reliable owing to the vibrations restraining it while passing through the gun tube.

OBJECT OF THE INVENTION

It is therefore an object of the present invention to provide a gun tube support assembly with which the aforesaid disadvantages can be overcome or at least minimised.

5

SUMMARY OF THE INVENTION

According to a first aspect of the invention there is provided a gun tube support assembly comprising a plurality of support sections arranged annularly around a gun tube, each including:

- 10 - a bush housing;
- a cradle bush for the bush housing for receiving and supporting the gun tube; and
- a damping means sandwiched between the bush housing and cradle bush, for absorbing and damping kinetic energy emanating
- 15 from the gun tube during firing thereof.

The damping means may be a resilient body selected from the group consisting of a rubber pad, a spring, and a pneumatic or hydraulic cushion.

- 20 Preferably the damping means comprises a pad of a relatively high-temperature silicon rubber.

The rubber pad may include a plurality of protrusions extending from a face of the pad for accommodating compression of the pad.

Each bush housing may comprise a curved metal plate having an inner surface
5 for abutting the rubber pad.

End flanges for connecting the bush housing to the cradle of the gun may be disposed towards opposite ends of the metal plate.

10 Removable side flanges for retaining the rubber pad may further be connectable to the sides of the plate.

Each cradle bush may comprise a metal plate curved complimentary to the bush housing plate and having an inner surface for abutting the gun tube and
15 an outer surface for abutting the rubber pad.

End flanges may extend in the direction of the bush housing from the respective opposite ends of the cradle bush plate.

20 Preferably the cradle bush is of brass.

The protrusions extending from the rubber pad may face towards the gun tube to abut the outer surface of the cradle bush.

Preferably, the gun tube support assembly includes between two and six, preferably four support sections arranged annularly around the gun tube and received in an opening in the cradle.

5

According to a second aspect of the invention there is provided a cradle for carrying a gun tube including a gun tube support assembly according to the first aspect of the invention.

- 10 According to a third aspect of the invention there is provided a gun provided with a gun tube support assembly according to the first aspect of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described further by way of a non-limiting example
15 with reference to the accompanying drawings wherein:

figure 1 is a perspective view of an assembled gun tube support assembly according to a preferred embodiment of the invention;

figure 2 is a perspective exploded view of a support section of the gun
20 tube support assembly of figure 1; and

figure 3 is a longitudinal-sectional view of the gun tube support assembly of figure 1 surrounding a gun tube.

DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

Referring to 1, a gun tube support assembly according to a preferred embodiment of the invention is generally designated by reference numeral 10.

- 5 Referring to figures 2 and 3, the gun tube support assembly 10 comprises four support sections 12 arranged annularly around a gun tube 13 and received in an opening in a cradle 15 of a gun (not shown), such as a cannon. The support assembly 10 therefore supports the gun tube 13 while allowing movement of the gun tube 13 relative to the cradle 15 when the gun is fired.

10

Each support section 12 comprises a bush housing 14 and a cradle bush 16 for the bush housing 14, which receives and supports the gun tube 13. Each support section 12 further comprises a damping means sandwiched between the bush housing 14 and cradle bush 16.

15

- The damping means is in the form of a resilient rubber pad 18 made of relatively high-temperature silicon rubber. The rubber pad 18 includes a plurality of protrusions 18.1 extending from a face of the pad 18 for abutting an outer surface of the cradle bush 16. The protrusions 18.1 accommodate
- 20 compression of the pad 18, the arrangement being such that the rubber pad 18 absorbs and dampens kinetic energy emanating from the gun tube 13 during firing of a projectile (not shown).

Each bush housing 14 comprises a curved metal plate 20 having an inner surface for abutting the rubber pad 18. End flanges 22 for connecting the bush housing 14 to the cradle 15 of the gun, by fastening means 24, are disposed towards opposite ends of the metal plate 20. Removable side flanges 26 for retaining the rubber pad 18 is further connected to the sides of the plate 20, by fastening means 28.

Each cradle bush 16 comprises a metal plate 30 curved complimentary to the bush housing plate 20 and has an inner surface that abuts the gun tube 13 and an outer surface that abuts the rubber pad 18. End flanges 32 extend in the direction of the bush housing 14 from the respective opposite ends of the cradle bush plate 30. The cradle bush 16 is made of brass to provide a smooth surface on which the gun tube 13 is supported and on which it slides, thus minimising friction.

In use, when the gun is fired and a projectile passes through the gun tube 13, the latter slides in the annular support assembly 10. Kinetic energy, which is transferred from the projectile passing through the gun tube 13 to the gun tube support assembly 10, is absorbed and dampened by the rubber pad 18.


The applicant has thus found that the rubber pad 18 absorbs and dampens kinetic energy such as vibrations, and restricts it from being transferred from the passing projectile through to the cannon structure when the gun is fired.

Metal fatigue is therefore limited and internal ballistics not as greatly affected.

The applicant further foresees that less transversal forces will act on the projectile, thus increasing its performance. The applicant further foresees that gun-jump and firing moment will be reduced through use of the gun tube support assembly 10.

It will be appreciated that variations in detail are possible with a gun tube support assembly according to the invention without departing from the scope of this disclosure.

DATED THIS 42nd DAY OF DECEMBER 2002.



D M KISCH INC

PATENT ATTORNEYS FOR THE APPLICANT

DENEL (PTY) LIMITED

3 Sheets
Sheet 1

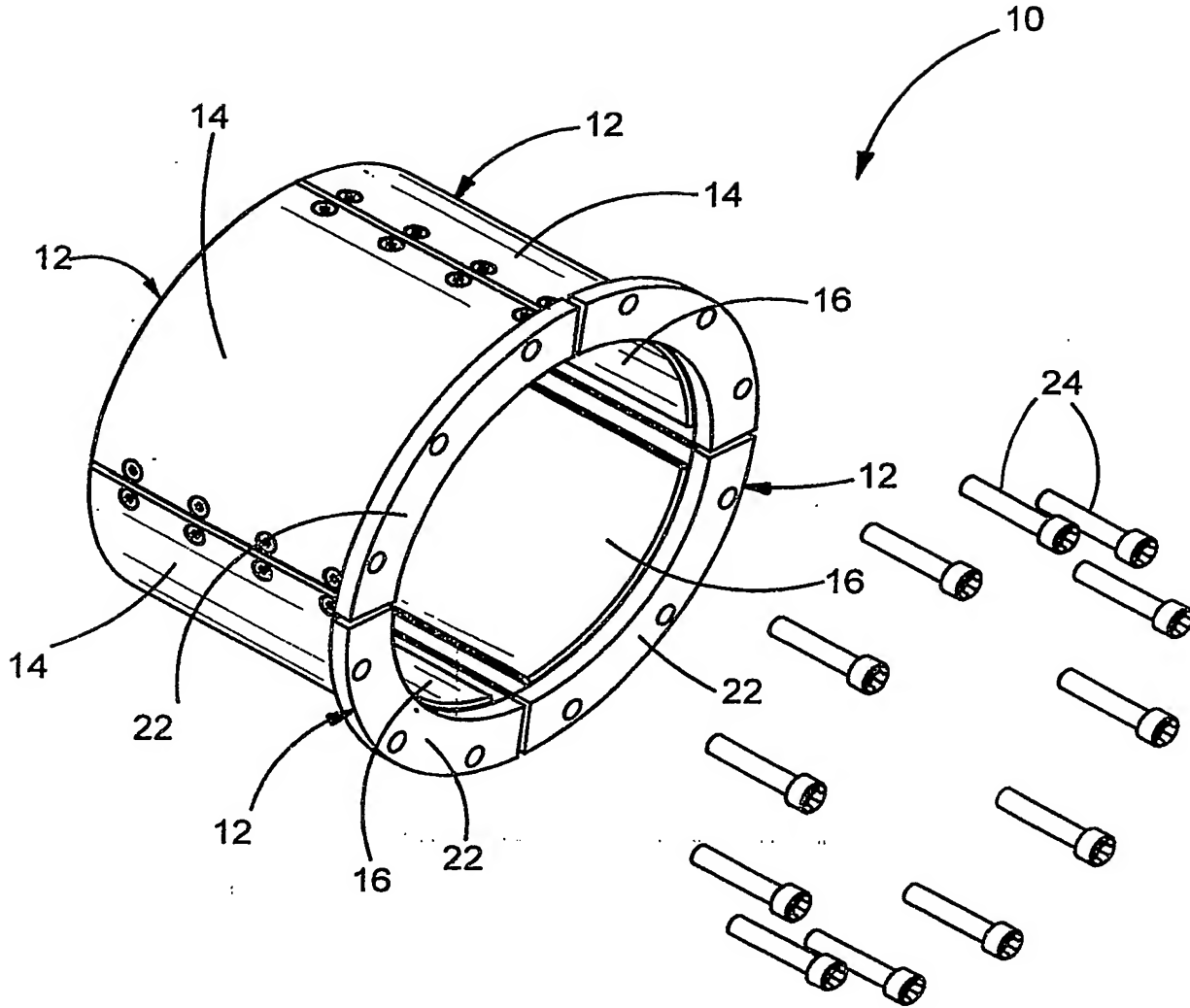
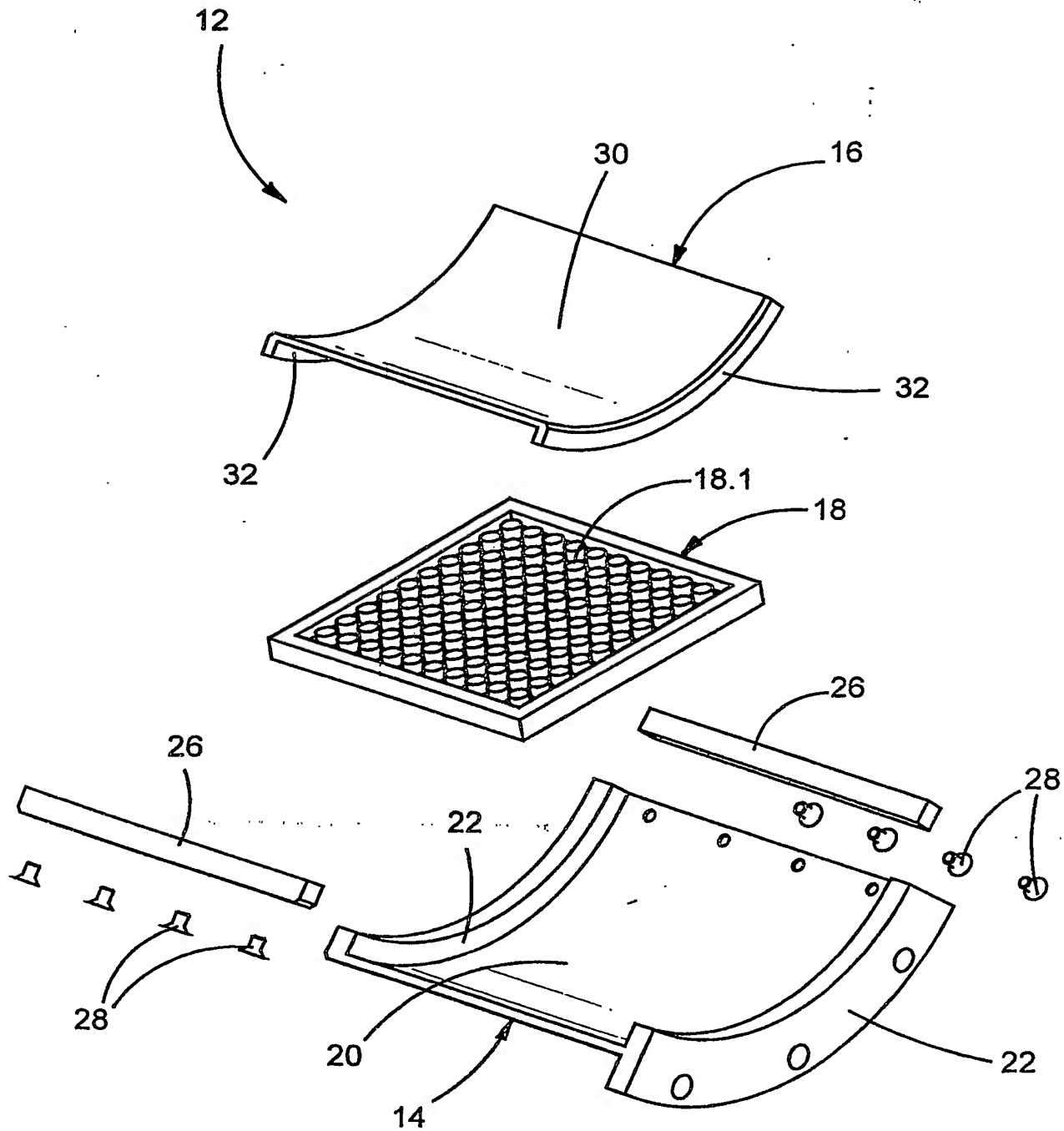


FIGURE 1

DENEL (PTY) LIMITED

3 Sheets
Sheet 2FIGURE 2

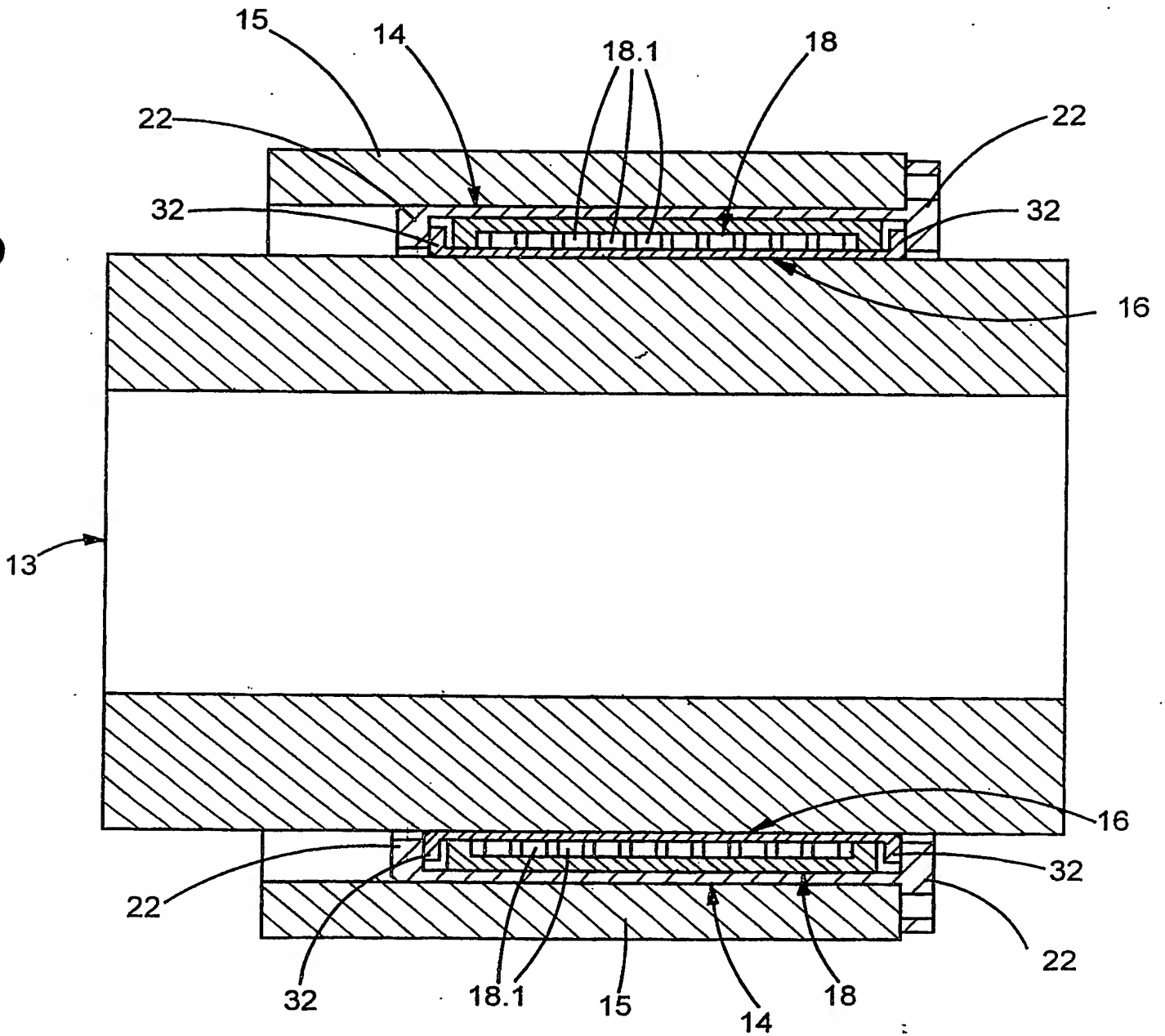


FIGURE 3

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